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Severson et al.

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## (54) DIRECT CONVERSION OF NARROW-BAND RF SIGNALS

## Related U.S. Application Data

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(76) Inventors: Matthew L. Severson, Oceanside, CA (US); Inyup Kang, San Diego, CA (US); Arun Raghupathy, San Diego, CA (US)

## Publication Classification

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## Correspondence Address:

Sarah Kirkpatrick

Intellectual Property Administration

QUALCOMM Incorporated

5775 Morehouse Drive

San Diego, CA 92121-1714 (US)

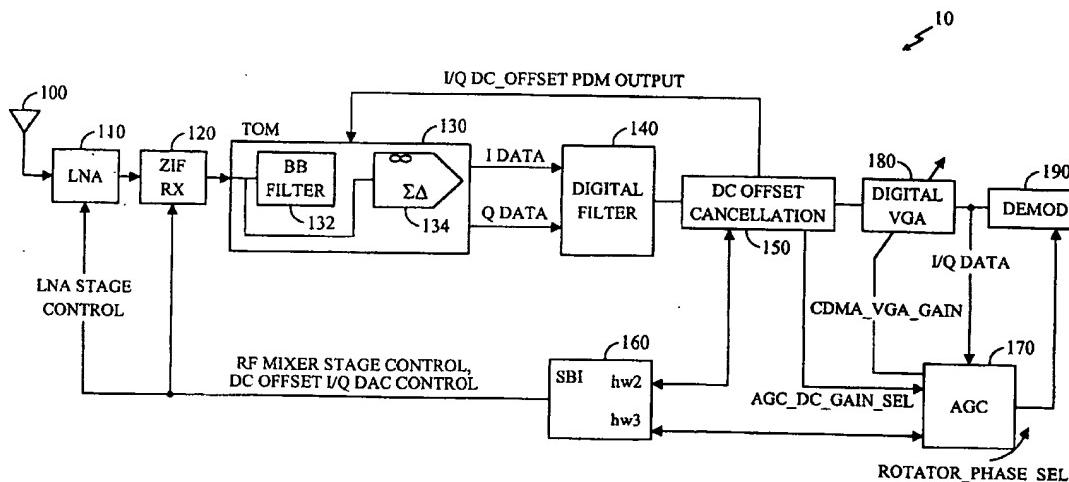
*Assignee*

(21) Appl. No.: 10/067,611

## ABSTRACT

A method and device for converting at least one narrow band RF signal, being suitable for transmission between at least one communications device suitable for receiving wide-band RF signals and at least one base station, to baseband. The method includes directly down-converting a signal spectrum including the at least one RF narrow-band signal to baseband such that the at least one narrow-band RF signal results at a low intermediate frequency (IF). And, digitally phase rotating the down-converted signal spectrum such that the at least one narrow-band RF signal is phase rotated from the low-IF to baseband.

(22) Filed: Feb. 4, 2002





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(12) **United States Patent**  
**Rahman et al.**

(10) **Patent No.:** US 6,560,447 B2  
(45) **Date of Patent:** May 6, 2003

(54) **DC OFFSET CORRECTION SCHEME FOR WIRELESS RECEIVERS**

(75) Inventors: **Mahibur Rahman**, Boynton Beach, FL (US); **Christopher T. Thomas**, San Diego, CA (US); **Robert Schweickert**, Mesa, AZ (US); **James Mittel**, Lake Worth, FL (US); **Clinton C. Powell, II**, Lake Worth, FL (US)

(73) Assignee: **Motorola, Inc.**, Schaumburg, IL (US)

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(21) Appl. No.: 09/798,216

(22) Filed: Mar. 5, 2001

(65) **Prior Publication Data**

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(51) Int. Cl.<sup>7</sup> ..... H04B 1/06

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375/319; 375/345

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256, 266, 313, 334, 339; 375/319, 324,  
345, 346

(56)

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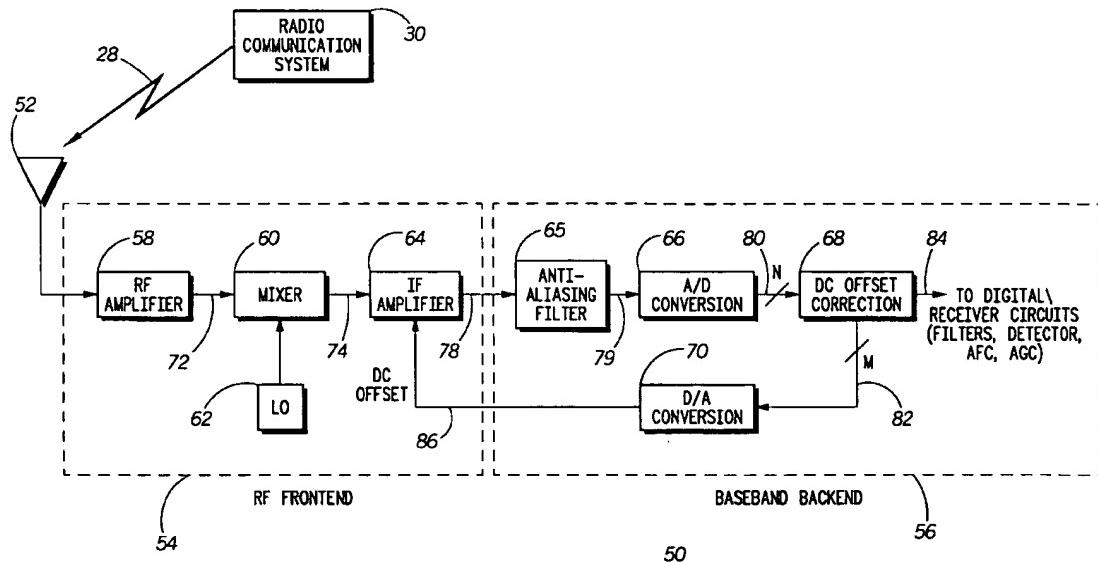
*Primary Examiner—Quochien Vuong*

(74) Attorney, Agent, or Firm—Randi L. Dulaney

(57) **ABSTRACT**

A DC offset correction circuit (68) provides DC offset correction within a receiver (50) for receiving and processing a radio frequency signal (28) within a radio communication system (30). The DC offset correction circuit (68) includes a feedback loop (88) for shifting a digital signal (80) by a programmable amount; and a coarse DC offset correction path (104) coupled to the feedback loop (88) for performing coarse DC offset correction.

**8 Claims, 7 Drawing Sheets**



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# United States Patent [19]

Gehring et al.

[11] Patent Number: 4,944,025

[45] Date of Patent: Jul. 24, 1990

[54] DIRECT CONVERSION FM RECEIVER WITH OFFSET

[75] Inventors: Mark R. Gehring, Portland; Richard R. Suter, Beaverton, both of Oreg.; Lawrence H. Ragan, Richardson, Tex.

[73] Assignee: AT&T Corporation, San Francisco, Calif.

[21] Appl. No.: 229,976

[22] Filed: Aug. 9, 1988

[51] Int. Cl. 5 H04B 1/16; H03D 3/18

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[58] Field of Search 455/207-209, 455/214, 47, 258, 61, 264, 316, 318, 319, 141-143, 324, 303-306, 192, 234; 329/50, 122, 124

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Primary Examiner—Reinhard J. Eisenzopf

Assistant Examiner—Curtis Kuntz

Attorney, Agent, or Firm—Klarquist, Sparkman, Campbell, Leigh & Whinston

[57] ABSTRACT

A direct conversion FM receiver that includes AC coupling and automatic gain control employs an offset frequency at the first local oscillator. The offset frequency prevents the frequency spectrum occupied by the signal modulation from being affected by AC coupling. The offset frequency is chosen so that it translates the frequency spectrum of the received signal outside the DC notch created in the spectrum by the AC coupling. To conserve battery supplied power, an error amplifier coupled between the output of the receiver and the first local oscillator maintains the offset frequency after it has been established by a frequency synthesizer, which is then turned off.

10 Claims, 2 Drawing Sheets

